

## CLAIMS

1. An apparatus for recovering polymer solids from a polymerisation effluent that comprises:

- a) a single-stage or multi-stage flash vessel (1) for flashing liquid in the effluent or a part thereof to vapour;
- b) a purge vessel (11) for removing residual liquid from the polymer solids ;

characterised in that, a transfer vessel (6) is introduced between the flash vessel and the purge vessel.

2. The apparatus of claim 1 further comprising valve means, measuring means, processing means and control means organised as follows:

- a) a flash vessel (1) for flashing liquid in the effluent or a part thereof to vapour;
- b) a first valve means (5) connecting the flash vessel (1) to the transfer vessel (6);
- c) a transfer vessel (6) located between the flash vessel (1) and the purge vessel (11);
- d) a second valve means (9) connecting the transfer vessel (6) to the purge vessel (11);
- e) a purge vessel (11) for removing residual liquid from the polymer solids;
- f) a measuring means (19) for measuring the level (7) of polymer solids in the transfer vessel;
- g) a processing means (21) for processing the level (7) read by measuring means (19), and for generating a feedback signal respectively to the first and second valve means (5) and (9);
- h) a first control means (17) for controlling the rate of transfer of polymer solids passing through the first valve means (5);
- i) a second control means (23) for controlling the rate of transfer of polymer solids passing through the second valve means (9).

3. The apparatus comprising features a) through e) of claim 2 and further comprising:

f') a first measuring means (13) for measuring the level (3) of polymer solids in the flash vessel (1)

g') a first processing means (15) for processing the level (3) measured in the flash vessel and for generating a feedback signal to control valve (5);

h') a first control means (17) for controlling the rate of transfer of polymer solids passing through the first valve means (5);

i') a second measuring means (19) for measuring the level (7) of polymer solids in the transfer vessel;

j') a second processing means (21) for processing the level (7) measured in the transfer vessel, and for generating a feedback signal to control valve means (9);

k') a second control means (23) for controlling the rate of transfer of polymer solids passing through the second valve means (9).

4. The apparatus comprising features a) through e) of claim 2 and further comprising:

f'') a measuring means (13) for measuring the level (3) of polymer solids in the flash vessel (1);

g'') a processing means (15) for processing the level (3) measured in the flash vessel and for generating a feedback signal respectively to the first and second control valves (5) and (9);

h'') a first control means (17) for controlling the rate of transfer of polymer solids passing through the first valve means (5);

i'') a second control means (23) for controlling the rate of transfer of polymer solids passing through the second valve means (9).

5. A process for recovering polymer solids from a polymerisation effluent, which comprises the steps of:

(a) extracting the polymerisation effluent from a polymerisation reactor;

(b) passing the effluent, or a part thereof, to a single-stage or multi-stage flash vessel (1) for flashing liquid in the effluent to vapour, and removing said vapour from said flash vessel;

(c) passing the polymer solids to a purge vessel (11) for removing residual liquid from the polymer solids;  
characterised in that, between the flash vessel and the purge vessel, the polymer solids are passed to a transfer vessel (6) wherein the level of polymer solids is maintained up to a pre-determined level (7) and wherein the layer of polymer solids present in the transfer vessel acts as seal isolating the flash vessel from the purge vessel.

6. A process according to claim 5, wherein the transfer apparatus comprises a first valve means (5) connecting the transfer vessel to the flash vessel, and a second valve means (9) connecting the transfer vessel to the purge means, and wherein the rate of transfer of polymer solids passing through the first valve means and the rate of transfer of polymer solids passing through the second valve means are controlled to maintain a quantity of polymer solids in the transfer vessel.

7. The process according to claim 6, wherein the rate of transfer of polymer solids passing through the first valve means is substantially the same as the rate of transfer of polymer solids passing through the second valve means.

8. The process according to any one of claims 5 to 7, which further comprises measuring the level of polymer solids in the transfer vessel and comparing the measured level with a predetermined level, and if necessary, adjusting said first and/or second valve means to ensure that the level of polymer solid in the transfer vessel is maintained substantially at the predetermined level.

9. The process according to any one of claims 5 to 8, which further comprises measuring the level of polymer solids in the flash vessel and comparing the measured level with a predetermined level, and if necessary, adjusting said first valve means to ensure the level of polymer solid in the flash vessel is maintained substantially at the predetermined level.

10. The process according to any one of claims 6 to 9, wherein the valve means are in the form of rotary valves.

11. The process according to any one of claims 5 to 10, wherein the purging means comprises a purge column through which nitrogen gas is passed.

12. The process according to claim 11, wherein the flash vessel operates at a first pressure, the transfer vessel operates at a second pressure, and the purge column operates at a third pressure, and wherein the first pressure is higher than the second pressure, and the second pressure is higher than the third pressure.

13. The process according to any one of claims 5 to 12, which further comprises condensing vapour that has been removed from the flash vessel, and recycling at least part of the condensed vapour to said polymerisation reactor.

14. The process according to any one of claims 5 to 13, wherein said polymerisation reactor is a double loop reactor.

15. The process according to any one of claims 5 to 15, wherein the polymer solids are formed from at least one olefin monomer.

16. The process according to claim 15, wherein the polymer solids are selected from polyethylene or polypropylene.